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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,342	08/05/2003	Thomas E. Drake JR.	1017.P051USC1	6153

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EXAMINER	
LEE, HWA S	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 11/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/634,342	DRAKE ET AL.	
	Examiner	Art Unit	
	Andrew Hwa S. Lee	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 1 is objected to because of the following informalities: An article such as "the" appears to be missing in the "detecting" clause before the words "second pulsed laser beam". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. **Claim 1** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nikoonahad in view of Heon et al. (US 5,137,361).

Nikoonahad et al. (Nikoonahad hereinafter) show a non-contact system for measuring film thickness comprising (e.g. Figure 2, column 4, lines 8-60):

directing a first pulsed laser beam to illuminate a portion of a surface of the remote target with an optical assembly ;

generating ultrasonic surface displacements within the illuminated portion of the surface of the remote target

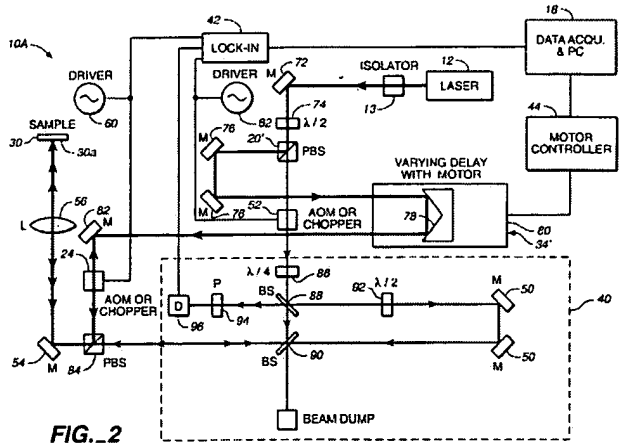

FIG._2

with the first pulsed laser beam;

directing a second pulsed laser beam substantially to the illuminated portion of the surface of the remote target, wherein the first pulsed laser beam and second pulsed laser beam are directed to the surface of the remote target;

detecting, using the second pulsed laser beam coaxial with first pulsed laser beam, the ultrasonic surface displacements substantially within the illuminated portion of the surface of the remote target;

collecting phase modulated light from the second pulse laser beam either reflected or scattered by the remote target; and

processing the phase modulated light to obtain data representative of the ultrasonic surface displacements on the surface of the remote target.

Nikoonahad does not expressly show that the processing is performed with an interferometer self-stabilized with the phase modulated light.

Heon et al (Heon hereinafter) show optical detection of surface motion of an object wherein the processing is performed with an interferometer self-stabilized with the phase modulated light (Heon shows a single detector can be used for the stabilization detector and the signal detector, column 4, lines 66+). At the time of the invention, one of ordinary skill in the art would have modified Nikoonahad to use a self-stabilized interferometer in order to avoid the drawback of having to locate the laser in the immediate vicinity of the receiving interferometer (Heon, column 1, lines 40+.

2. **Claims 2 and 3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nikoonahad and Heon as applied to claim 1 above and further in view of Schultz et al (US 5,402,223).

Nikoonahad does not show the converting of the analog signals to digital signals. Schultz et al show a furnace control system using an interferometer comprising of converting the detection signals from analog to digital signals. At the time of the invention, one of ordinary skill in the art would have converted the analog signals to digital signals in order to electronically analyze the signals by a computer.

3. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nikoonahad and Heon as applied to claim 1 above, and further in view of Maris (6,008,906).

Nikoonahad shows all the claimed elements but does not show a scanning optical assembly. Maris teaches that a scanning assembly (head) can be used for scanning large objects (column 9, lines 57+). At the time of the invention, one of ordinary skill in the are would have been motivated to use a scanning optical assembly in order to be able to scan large objects.

4. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nikoonahad, Heon, and Maris '906 as applied to claim 4 above, further in view of Siu et al (6,181,431).

Nikoonahad does not expressly show the intensity controller. Siu et al show ultrasonic evaluation system comprising a controlled pulsed laser. At the time of the invention, one of ordinary skill in the art would have used a controller for the laser in order to control the magnitude and pulse of the laser.

5. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nikoonahad, Heon, and Maris '906 as applied to claim 4 above, further in view of Maris (5,706,094).

Nikoonahad does not expressly show the wavelength of the laser beam. Maris shows an ultrafast optical technique for the characterization of altered materials comprising of a pulsed laser source having a wavelength of about 10 microns. At the time of the invention, one of ordinary skill in the art would have used a pulsed laser having a wavelength of about 10 microns since Nikoonahad is silent about the wavelength and Maris suggests that the wavelength should be about 10 microns.

6. **Claims 7 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nikoonahad, Heon, and Maris as applied to claim 4 above, and further in view of Monchalin et al (US 5,080,491).

Nikoonahad and Maris show all the elements but does not show the stabilization using the light from the target. Monchalin et al (Monchalin hereinafter) show for example in Figure 6, the stabilization using the light from the target. At the time of the invention, one of ordinary skill in the art would have modified Nikoonahad and Maris to use the stabilization method of

Monchalin in order to allow ultrasound detection that is immune from intensity fluctuations of the laser and perturbations on the object surface (Abstract).

7. **Claims 9, 11-13, 15, 17, and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Monchalin in view of Maris (6,008,906) and Heon.

Monchalin shows a laser optical ultrasound detection using two interferometers comprising:

a detection laser to generate a pulsed laser beam to detect the ultrasonic surface displacements on the surface of the remote target; collection optics for collecting phase modulated light from the pulsed laser beam either reflected or scattered by the remote target; an interferometer to process the phase modulated light collected by the collection optics, wherein the interferometer is stabilized with the collected phase modulated light either reflected or scattered by the remote target (figure 6);

said interferometer comprising:

a first cavity (97) having a first confocal lens structure; a second cavity (99) having a second confocal lens structure; a device (91, 93) for dividing incoming de-polarized light into a first polarized light component and a second polarized light component wherein said device also directs said first and second polarized light components into the first and second cavities;

a control system (117, 119) to adjust said first and second cavities such that a ratio of light transmitted through each cavity to light reflected back through each cavity remains substantially constant.

Monchalin does not expressly show the processor but shows the light transmitted through the first cavity, the light reflected back through the first cavity, the light transmitted through the second cavity, and the light reflected back through the second cavity, all in order to obtain data representative of the ultrasonic surface displacements on the surface of the remote target. Processors are well known and at the time of the invention, one of ordinary skill in the art would have used a processor to analyze the signals.

Monchalin shows all the claimed elements but does not show a scanning optical assembly. Maris '906 teaches that a scanning assembly (head) can be used for scanning large objects (column 9, lines 57+). At the time of the invention, one of ordinary skill in the are would have been motivated to use a scanning optical assembly in order to be able to scan large objects.

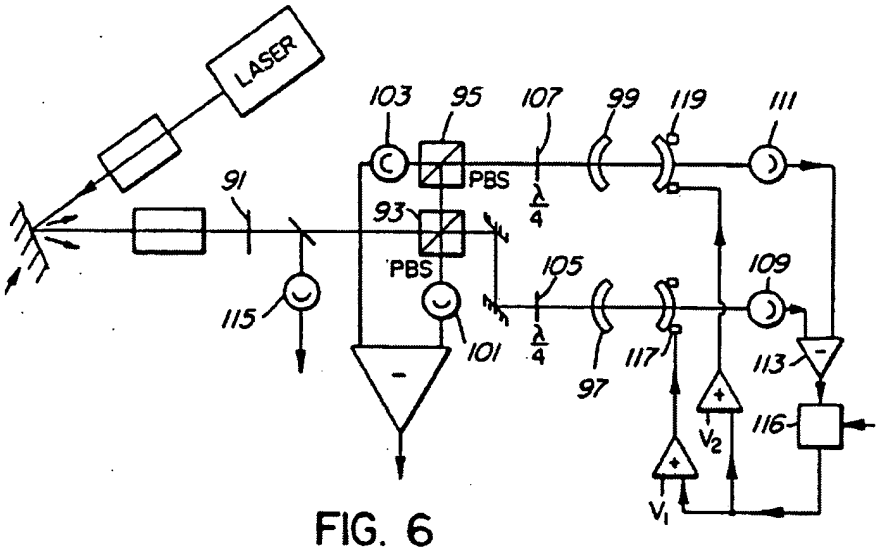

FIG. 6

Monchalin also does not expressly show that the processing is performed with an interferometer self-stabilized with the phase modulated light.

Heon shows optical detection of surface motion of an object wherein the processing is performed with an interferometer self-stabilized with the phase modulated light (Heon shows a single detector can be used for the stabilization detector and the signal detector, column 4, lines 66+). At the time of the invention, one of ordinary skill in the art would have modified Nikoonahad to use a self-stabilized interferometer in order to avoid the drawback of having to locate the laser in the immediate vicinity of the receiving interferometer (Heon, column 1, lines 40+.

With regards to the moving of the laser or the sample of claims 11, 12, and 17, it is well known to move either the sample or the target in order to scan the sample completely rather than just a single spot, and one of ordinary skill would have done so in order to evaluate the whole sample.

8. **Claims 10 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Monchalin, Maris '906, and Heon as applied to claim 9 and 15 above, further in view of Siu et al.

Monchalin does not expressly show the intensity controller. Siu et al show ultrasonic evaluation system comprising a controlled pulsed laser. At the time of the invention, one of

ordinary skill in the art would have used a controller for the laser in order to control the magnitude and pulse of the laser.

9. **Claims 14 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over White et al (US 6,128,081) in view of Monchalin, Maris '906, and Heon.

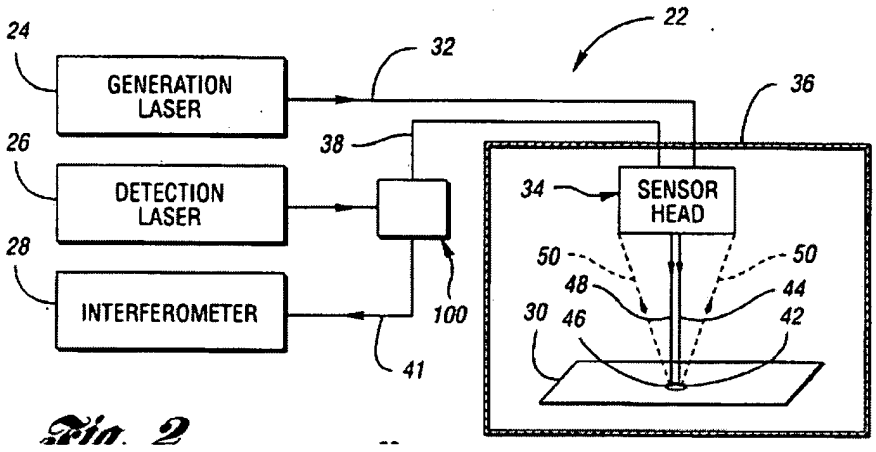

Fig. 2

White et al show a method and system for measuring a physical parameter wherein the generation laser and the detection laser coaxially apply laser beams to the surface of the remote target. White et al does not show the interferometer comprising: a first cavity (97) having a first confocal lens structure; a second cavity (99) having a second confocal lens structure; a device (91, 93) for dividing incoming de-polarized light into a first polarized light component and a second polarized light component wherein said device also directs said first and second polarized light components into the first and second cavities.

Monchalin shows an interferometer (for example in Figure 6) used for measuring the surface characteristics comprising: an interferometer to process the phase modulated light collected by the collection optics; said interferometer comprising: a first cavity (97) having a first confocal lens structure; a second cavity (99) having a second confocal lens structure; a device

(91, 93) for dividing incoming de-polarized light into a first polarized light component and a second polarized light component wherein said device also directs said first and second polarized light components into the first and second cavities; a control system (117, 119) to adjust said first and second cavities such that a ratio of light transmitted through each cavity to light reflected back through each cavity remains substantially constant.

Monchalin does not expressly show the process but shows the light transmitted through the first cavity, the light reflected back through the first cavity, the light transmitted through the second cavity, and the light retlected back through the second cavity, all in order to obtain data representative of the ultrasonic surface displacements on the surface of the remote target. Processors are well known and at the time of the invention, one of ordinary skill in the art would have used a processor to analyze the signals.

At the time of the invention, one of ordinary skill in the art would have modified White et al to use the interferometer of Monchalin in order to allow ultrasound detection that is immune from intensity fluctuations of the laser and perturbations on the object surface (Abstract).

Maris teaches that a scanning assembly (head) can be used for scanning large objects (column 9, lines 57+). At the time of the invention, one of ordinary skill in the are would have been motivated to use a scanning optical assembly in order to be able to scan large objects.

White does not expressly show that the processing is performed with an interferometer self-stabilized with the phase modulated light.

Heon shows optical detection of surface motion of an object wherein the processing is performed with an interferometer self-stabilized with the phase modulated light (Heon shows a single detector can be used for the stabilization detector and the signal detector, column 4, lines 66+). At the time of the invention, one of ordinary skill in the art would have modified Nikoonahad to use a self-stabilized interferometer in order to avoid the drawback of having to locate the laser in the immediate vicinity of the receiving interferometer (Heon, column 1, lines 40+.

Response to Arguments

Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa S. Lee whose telephone number is 571-272-2419. The examiner can normally be reached on Tue-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew Hwa Lee
Primary Examiner
Art Unit 2877